

3.0 ECONOMIC ANALYSIS

In order to compare costs of waste disposal alternatives, three scenarios of saturation development were investigated. In the first, the entire study area is assumed to be sewered at present "large lot" type development; in the second, the recommended plan, sewers are assumed to serve about 11,000 dwelling units, with on-site systems serving dwellings on the remaining suitable land area. The third configuration studied was one of saturation development with only on-site waste treatment, that is, no new sewers. The results of the cost estimation procedure for each of the three configurations are presented below.

3.1 Large Lot Life Style

This represents the estimated actual costs of sewerage the entire Hillside study area at existing densities and as presently platted. To arrive at the total system cost, five sample study areas were chosen, all with existing "paper plats" defining a subdivision. These areas were assessed for sewerage costs, and an average cost per dwelling unit was obtained. Finally, these averages were extended over the study area to obtain an estimated total cost of sewerage with large lot lifestyle maintained.

The assumptions used in this analysis are:

1. Select five study areas.
2. Use existing subdivision design.
3. Serve all lots with gravity sewers.
4. Lateral costs shared by residents of each area. Base cost: \$120/ft., with multiplier for difficulty of construction, range 1.25 to 2.0.
5. Trunk costs assessed at 7¢ per square foot of lot area, 150 ft. setback exclusion rule maintained.

The results of this evaluation is given in Table 3-1. They indicate that large lot development results in high costs for sewerage installation. This, of course, is to be expected since sewerage is generally intended for small lot development, where costs can be divided over a larger number of users.

This copy of the Hillside Wastewater Management Plan is provided by the Hillside's Home And Land Owners (HALO, Inc.).

3.2 Recommended Plan

Saturation development under the recommended plan would include medium to high density development in the proposed new sewer service areas 1-4, clustered on-site systems in area 5, and individual on-site systems in the remaining suitable, developable land area. Assumptions made for the purposes of this estimate include:

1. Densities of sewered areas will be as shown on recommended plan map.
2. Flow equals 100 gpcd plus 25% for infiltration and reserve capacity.
3. Lines will be run on basis of single-family, detached residences. While cluster development may save on costs, it was not within the scope of this study to design subdivisions.
4. Areas of slope steeper than 20% are to be considered non-developable.
5. Trunk improvements costs assessed same as for large lot.
6. Service connects: \$18/ft.
7. Lengths of service connects depends on lot size - costs for each area will be averaged.

The results of this evaluation are shown on Table 3-2. They indicate that the cost to provide sewerage to the principal areas to receive sewers range between \$3600 and \$4500 per dwelling unit. A more concentrated development pattern results in lower per unit costs, because of larger number of users.

3.3 Total On-Site System Costs

This estimate assumes that the entire Hillside will be developed with on-site waste treatment only. To obtain the costs for typical on-site systems, local contractors were approached with sample plans and specifications for installation of a septic tank and drainfield. The results of this procedure as well as total on-site system cost are presented below:

Assumptions:

1. Assume two soil types: Sandy and Silt Loam Percolation Rates-5 and 45/min./in., respectively.
2. Four system configurations were used deep trench, shallow trench, shallow trench with drop boxes and curtain drains, and mound systems.
3. Size system for 3-Br. house, 1000 gal. septic tank.
4. For total, use suitable, unoccupied, private land at density of 1 D.U. per Acre.

The results of this evaluation are given on Table 3-4. Given the assumptions of construction costs and system design, on-site sewerage of the remaining, generally developable areas of the Hillside will entail a cost of nearly 24 million in today's prices.

3.4 Comparative Cost Estimates

Table 3-6 indicates the costs of:

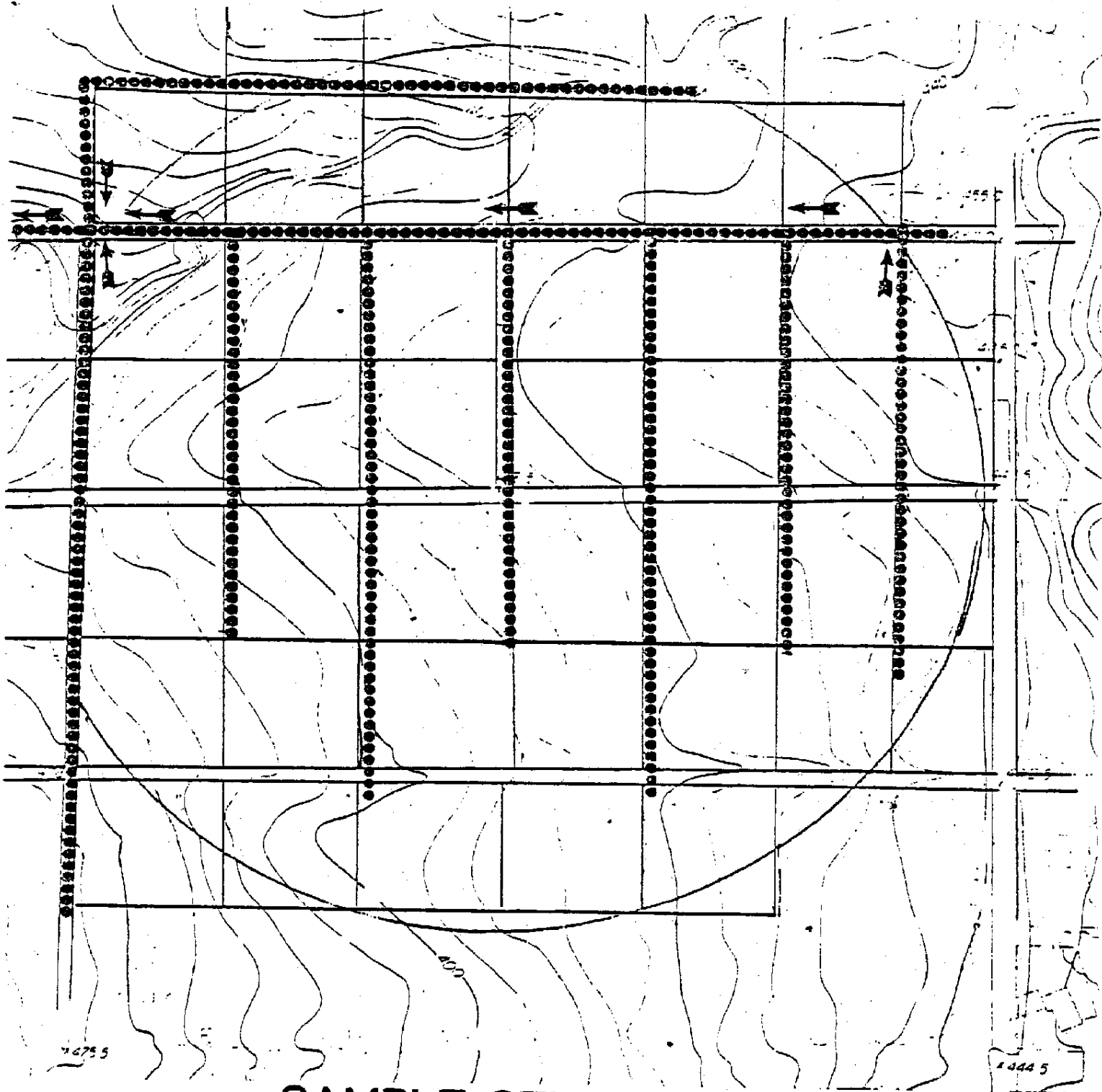
1. Sewerage in areas recommended to be served by sewers.
2. On-site system installation in areas to be served by systems other than sewerage.
3. Sewerage costs if the entire Hillside is sewerred (costs of sewerage for 1 and 2).

The Plan, if implemented, will cost \$74.2 million (\$52.5 million for sewerage and \$21.7 million for on-site systems). Although these are sizeable costs, they must be viewed in comparison: If the entire Hillside were to require sewerage -- certainly a possibility if some form of more comprehensive on-site system management program is not implemented -- this condition would result in an approximate cost of \$510 million.

In terms of per unit costs the recommended Plan entails the following:

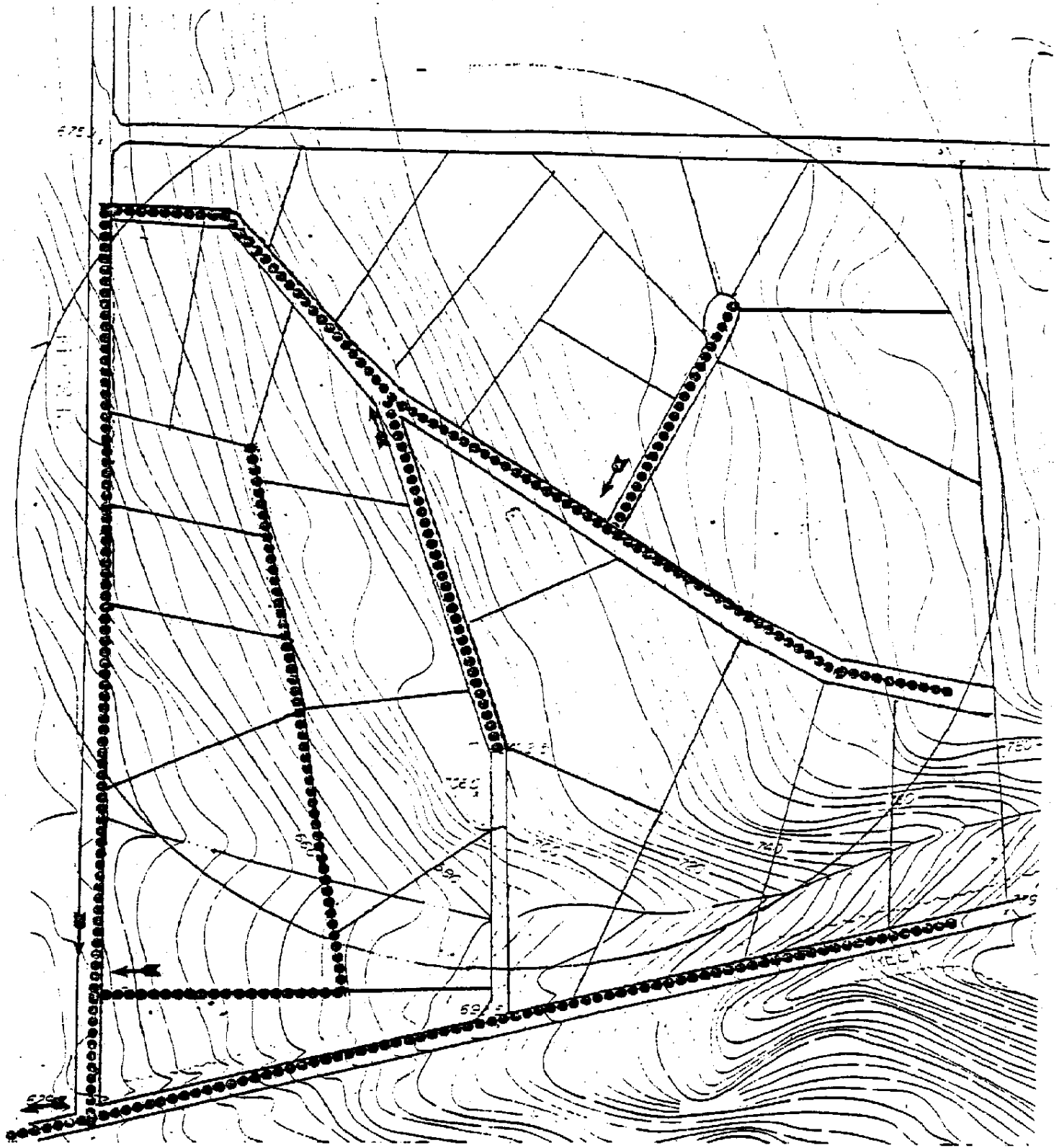
	<u>Dwellings Served</u>	<u>Acreage Served</u>	<u>Per Unit Cost</u>	<u>Total Cost</u>
Sewered Area	11,650	1,790	\$4,510	\$52,550,000
On-Site Area	5,459	6,825	\$4,390	\$23,964,400

Thus, on a per unit basis, the costs of on-site and sewerage are relatively similar.



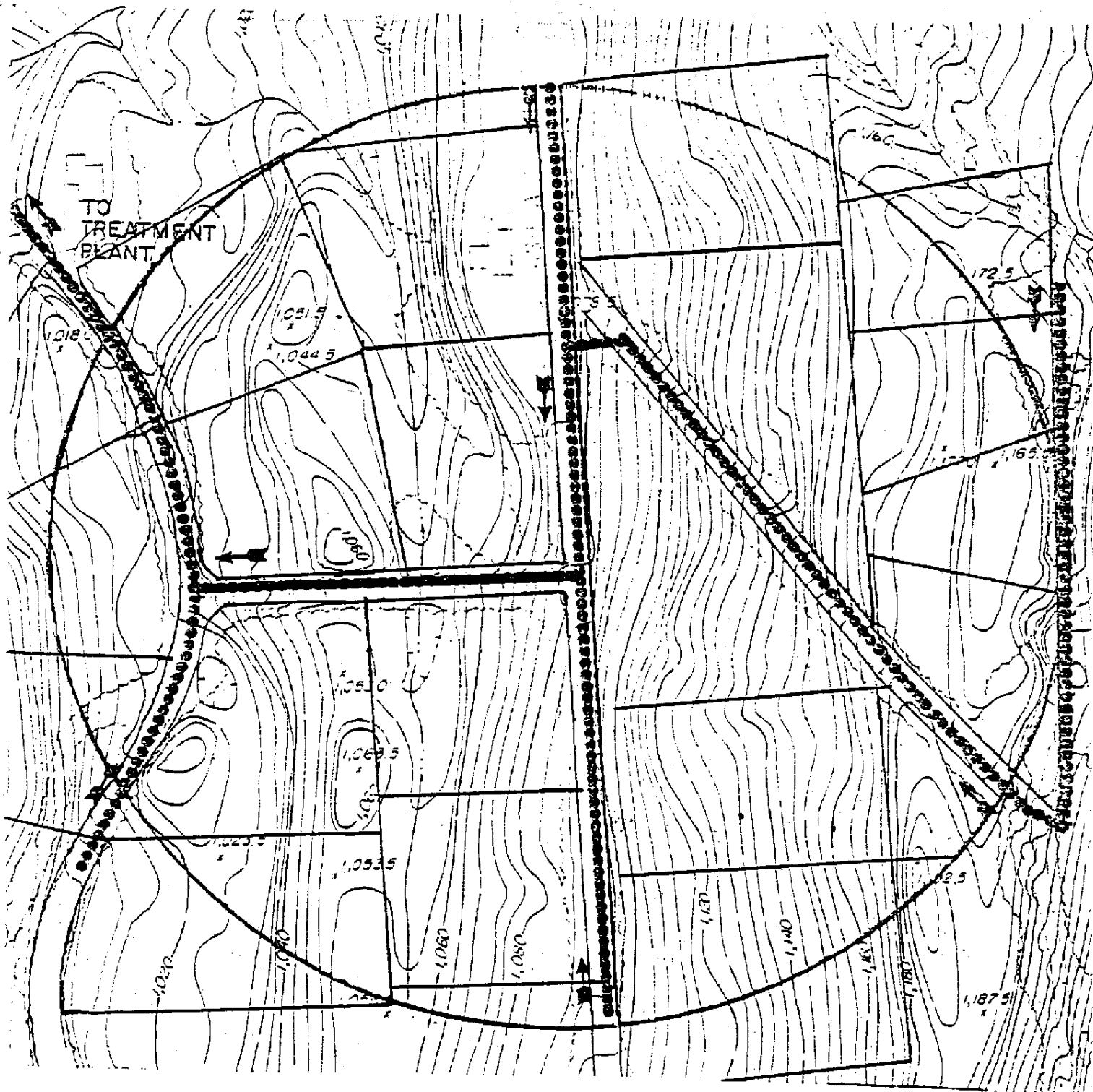
SAMPLE STUDY AREA A

NO. OF D.U.'S:	47
TOTAL AREA:	47 (acres)
AVERAGE LOT SIZE:	44,000 (sq. ft.)
TOTAL SEWER LENGTH:	8,000 (ft.)
CONTOUR INTERVAL:	4 (ft.)



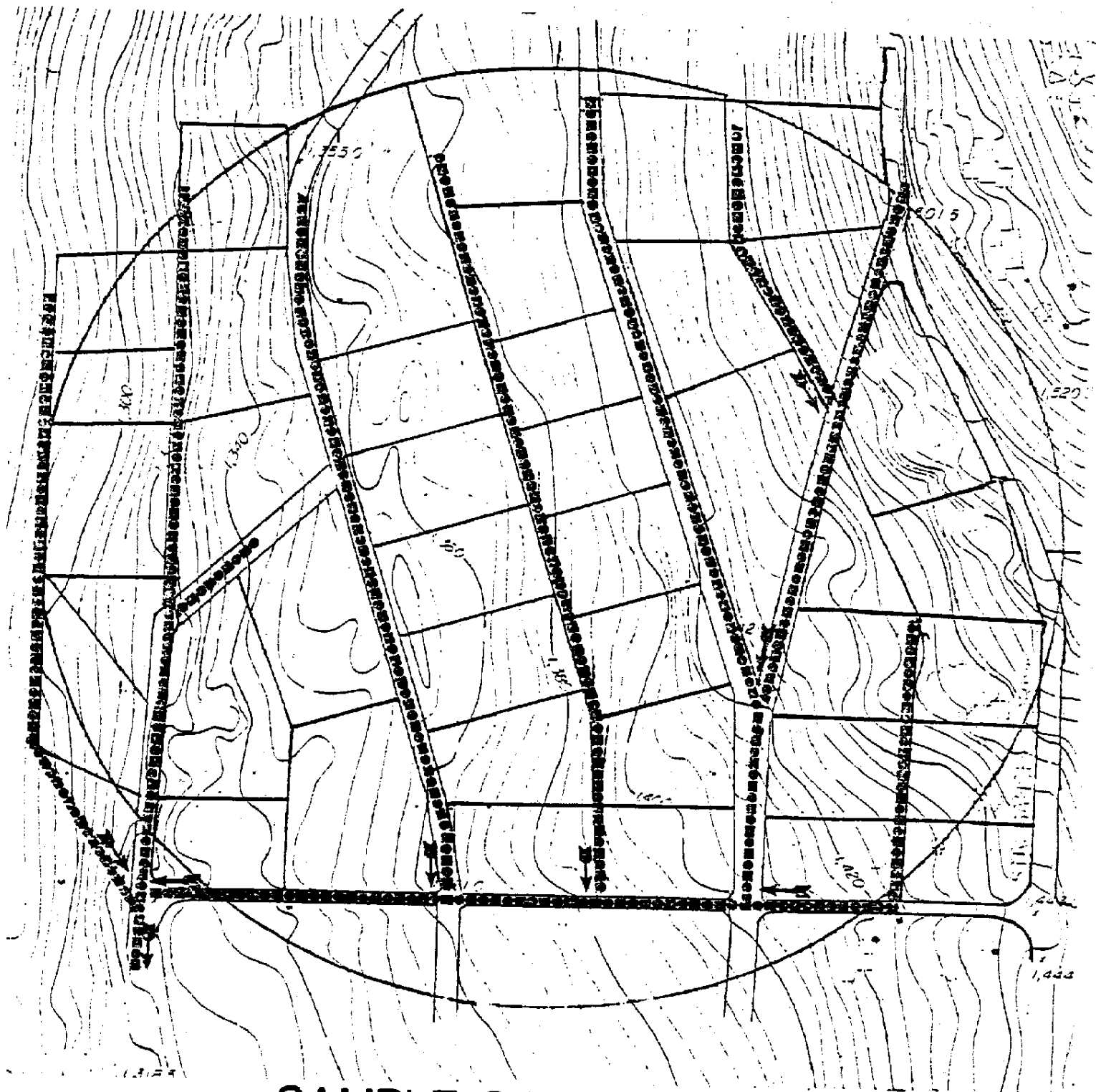
SAMPLE STUDY AREA B

NO. OF D.U.'S:	27
TOTAL AREA:	41 (acres)
AVERAGE LOT SIZE:	67,000 (sq.ft.)
TOTAL SEWER LEN 'H:	CONTOUR INTERVAL: 4 (ft.)



SAMPLE STUDY AREA C

NO. OF D.U.'S:	21
TOTAL AREA:	46 (acres)
AVERAGE LOT SIZE:	96,000 (sq. ft.)
TOTAL SEWER LENGTH:	5,600 (ft.)
CONTOUR INTERVAL:	4 (ft.)



SAMPLE STUDY AREA E

NO. OF D.U.'S:	47
TOTAL AREA:	32 (acres)
AVERAGE LOT SIZE:	30,000 (sq. ft.)
TOTAL SEWER LENGTH:	8,900 (ft.)
CONTOUR INTERVAL:	4 (ft.)

TABLE 3-1
ESTIMATED SEWER COSTS
LARGE LOT LIFE STYLE

AREA	TOTAL AREA (Ft. 2)	NO. OF DWELLING UNITS	AVERAGE DU LAND AREA (sq. ft.)	TOTAL SEWER LENGTH (ft.)	LATERAL IMPROVEMENT COST/DU(\$)	SEWER SERVICE CONNECT(\$)	TRUNK IMPROVEMENT COSTS/DU(\$)	TOTAL COST/DU (\$)
A	2,068,000	47	44,000	8,000	25,530	2,250	2,790	30,570
B	1,809,000	27	67,000	6,000	40,000	2,250	2,550	44,800
C	2,016,000	21	96,000	5,600	64,000	2,250	4,350	70,600
D	1,853,600	45	28 @ 56,000 17 @ 16,800	5,200	17,330	2,250	2,350	21,930
E	1,410,000	47	30,000	8,900	39,770	2,250	1,440	43,460
TOTALS OF AVERAGE	9,156,600	187	40,580 (.93 Acre)	33,700	33,550	2,250	2,380	38,180

TABLE 3-2
ESTIMATED SEWER COSTS
OF RECOMMENDED PLAN

AREA	DEVELOPABLE AREA (ACRES)	NO. OF DWELLING UNITS	AVERAGE DU LAND AREA (Acre)	TOTAL SEWER LENGTH (Ft.)	LATERAL IMPROVEMENT COSTS/DU(\$)	SEWER SERVICE CONNECT(\$)	TRUNK IMPROVEMENT COSTS/DU(\$)	TOTAL COST/DU (\$)
1	90	875	0.10	19,050	2,390	900	890	\$4,180
2	460	2,730	0.17	67,100	2,550	1,050	520	4,120
3*	740	3,320	0.22	99,050	3,630	1,200	680	5,510
4*	1,050	4,725	0.22	62,200	1,730	1,200	700	3,630

*A pumping station and force main are required to serve these areas.
If costs are assessed to residents of areas 3 & 4, total costs per
D.U. are as follows:

Area 3 - \$5,780

Area 4 - \$3,900

TABLE 3-3

ON-SITE SYSTEM ALTERNATES

Type System	Estimated System Capital Costs*	
	Silt Loam	Sandy Soils
Deep Trench	\$ 3,650	\$ 3,900
Shallow Trench with Drop Boxes	3,625	3,875
Shallow Trench with Drop Boxes and Curtain Drain (70')	6,425	7,925
Mound System	8,600	-----

*These costs will vary with soils conditions, terrain, vegetative cover, and weather conditions.

TABLE 3-4

TOTAL ON-SITE SYSTEMS COST

TYPE SYSTEM	TOTAL ACREAGE	NUMBER OF SYSTEMS	COST PER SYSTEM	TOTAL COST
Mounds	714	571	\$ 8,600	\$ 4,911,000
Shallow Trenches with Curtain Drains	243	194	7,175	1,394,350
"Conventional" System	5,868	4,694	3,762*	17,659,420
			TOTAL	\$23,964,400

*Average Cost

TABLE 3-5

COST OF OPERATION ESTIMATES

<p>ON-SITE SYSTEMS OPERATION (No Reconstruction Costs are Included)</p> <p>(Based on Pumping Every 2 years)</p>	<p>COST PER YEAR DWELLING UNIT</p> <p>\$30.00</p>
<p>SEWER SERVICE CHARGE</p>	<p>\$90.00</p>

TABLE 3-6

HILLSIDE AREAWIDE COST ESTIMATES

COST CLASSIFICATION	AREA (Acres)	DWELLING UNITS	COST PER DWELLING UNIT	TOTAL ALTERNATE COST
Estimated Sewer Service Area 1	90	875	\$ 4,180	\$ 3,655,600
Estimated Sewer Service Area 2	460	2,730	4,120	11,255,140
Estimated Sewer Service Area 3	740	3,320	5,510	18,300,000
Estimated Sewer Service Area 4	1,050	4,725	3,630	17,136,000
Estimated Force Main - Areas 3 & 4	Alternate #1 - 2,510,000		Alternate #2 - 2,202,000	Use Alternate #2: 2,202,000
Sub Totals: Sewer Service Areas	2,340	11,650	4,510	52,550,000
Total Cost Sewer Service Areas 1-4 Plus On-site Systems				74,253,000
Total Estimated On-site System Costs @ Max. Development	6,825	5,459	4,390	23,964,400
Estimated Total Costs For Sewers Throughout Hillside with Large Lot Life Style Maintained	13,366	13,366	\$ 38,180	510,313,880